(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
11 April 2002 (11.04.2002)

PCT

(10) International Publication Number
WO 02/30162 A2

(51) International Patent Classification⁷: H05B 41/292

(21) International Application Number: PCT/EP01/11171

(22) International Filing Date:
26 September 2001 (26.09.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/684,196 6 October 2000 (06.10.2000) US

(71) Applicant: KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventor: CAMMACK, David, A.; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(74) Agent: DUSSELDORP, Jan, C.; INTERNATIONAAL OCTROOIBUREAU B.V., Prof Holstlaan 6, NL-5656 AA Eindhoven (NL).

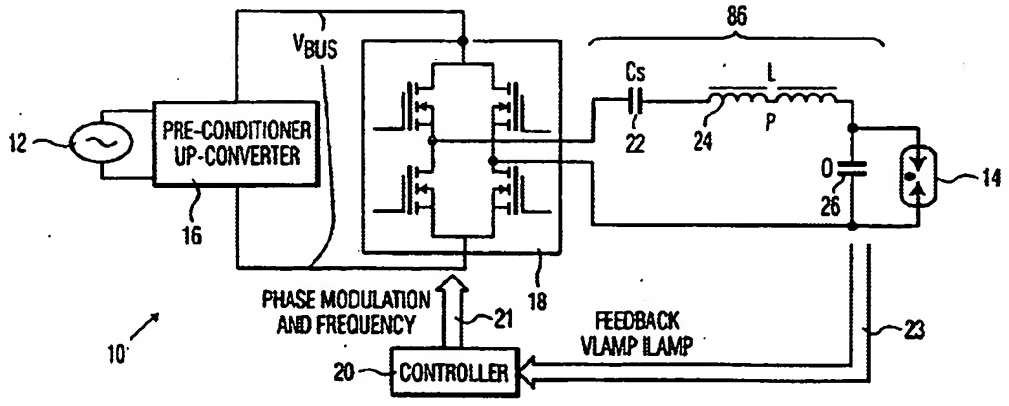
(81) Designated States *(national)*: CN, JP.

(84) Designated States *(regional)*: European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A SYSTEM AND METHOD FOR EMPLOYING PULSE WIDTH MODULATION FOR REDUCING VERTICAL SEGREGATION IN A GAS DISCHARGE LAMP



(57) Abstract: In accordance with one embodiment of the present invention a system for driving a gas discharge lamp is comprised of a bridge circuit configured to provide a pulse voltage signal, a controller configured to generate a pulse width modulated signal corresponding to a desired waveform. A filter circuit is also configured to receive and filter the pulse voltage signal provided by the bridge circuit. In one embodiment of the invention the gas discharge lamp is driven by a pulse voltage signal corresponding to a pulse width modulation signal. The pulse width modulated signal is generated corresponding to a desired waveform, wherein the desired waveform includes a sweeping frequency signal and a fixed frequency amplitude modulating signal.

A system and method for employing pulse width modulation for reducing vertical segregation in a gas discharge lamp

This invention relates to a system for driving a gas discharge lamp and more specifically to a system employing pulse width modulation for reducing color segregation in high intensity gas discharge lamps.

High intensity discharge lamps (HID) are becoming increasingly popular because of their many advantages, such as efficiency and light intensity. These HID lamps are driven by either a high frequency electronic ballast that is configured to generate driving current signals at above 20Khz range or by a low frequency electronic ballast with driving current signals in the 100Hz range.

A major obstacle to the use of high frequency electronic ballasts for HID lamps, however, is the acoustic resonances/arc instabilities which can occur at high frequency operation. Acoustic resonances, at many instances, can cause flicker of the arc which is very annoying to humans. Furthermore, acoustic resonance can cause the discharge arc to extinguish, or even worse, stay permanently deflected against and damage the wall of the discharge lamp.

Recently, a new class of high intensity discharge lamps has been developed that employ ceramic (polycrystalline alumina) envelopes. The discharge envelope in this class of lamps is cylindrical in shape, and the aspect ratio, i.e., the inner length divided by the inner diameter is close to one, or in some instances more than one. Such lamps have the desirable property of higher efficacy, but they have the disadvantage of having different color properties in vertical and horizontal operation. In particular, in vertical operation color segregation occurs.

The color segregation can be observed by projecting an image of the arc onto a screen, which shows that the bottom part of the arc appears pink, while the top part appears blue or green. This is caused by the absence of complete mixing of the metal additives in the discharge. In the upper part of the discharge there is excessive thallium emission and insufficient sodium emission. This phenomena leads to high color temperature and decreased efficacy.